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1 31. (Amended) The spin cytometer of claim 27, further comprising an additional one
2 (1) or more detector means, each detector means responsive to a light signal generated
3 by one of the light sources.

1 33. (New) The spin cytometer of claim 10, wherein the movement means moves the
2 transparent cylinder in a direction substantially parallel to the transparent cylinder's
3 longitudinal axis.

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1 34. (New) The spin cytometer of claim 10, wherein the movement means moves the
2 light source and detector means in a direction substantially parallel to the transparent
3 cylinder's longitudinal axis.

REMARKS

This paper is intended to be a complete response to the above-identified Office Action. It is believed no fee is due. If fees are required, however, the Assistant Commissioner is authorized to deduct the necessary charges from Deposit Account 501927/010-US-002.

The Examiner is requested to note and acknowledge that a Power of Attorney has been filed for this application (dated 10 June 2002). The Examiner is further requested to note that the attorney docket number for this matter is 010-US-002.

Examiner Interview

The Examiner and the below signed attorney held a telephone interview on Tuesday, 13 August 2002. During the interview the parties discussed the general field of flow cytometry and the cited prior art. The Examiner acknowledged that the cited

prior art do not spin a sample container about its longitudinal axis for the purpose of flow cytometric analysis. The Examiner expressed her belief, however, that the independent claims as presented fail to "connect" the language of the claims' bodies with the cytometer apparatus language of the claims' preambles.

Substitute Specification

Pursuant to 37 C.F.R. 1.125, Applicant submits the attached substitute specification. A first copy of the substitute specification indicating all proposed changes in mark-up format is attached to, and made part of, this Reply. A second copy of the substitute specification void of mark-up indications is also attached to, and made part of, this Reply. No new matter has been entered in the substitute specification. In summary, the substitute specification includes:

- A cross-reference to this application's provisional application as required by the Examiner (see page 1 at lines 3-4 in the substitute specification);
- Elimination of the previously used "Prior Art" section so that the application's format conforms to standard practice as required by the Examiner (see page 2 at lines 22-28 in the substitute specification);
- Modification of the "Description of the Drawings" subject heading to conform to standard practice as required by the Examiner (see page 4 at lines 24-25 in the substitute specification);
- Modification of the "Detailed Description" subject heading to conform to standard practice as required by the Examiner (see page 4 at line 1 in the substitute specification); and
- Modification of the capitalization of the identified "Example" heading to obtain consistency therein.

Cancelled Claim 32

As amended, independent claims 1 and 10 are believed to duplicate the subject matter of claim 32 and, accordingly, claim 32 has been cancelled without prejudice.

New Claims 33 and 34

Claims 33 and 34 have been added by this Reply and are directed to further clarify the subject matter of independent claim 10. Specifically, claims 33 and 34 make it clear that *either* the rotating means *or* the light source and detector means may be moved relative to the other to effect the described scanning process. The subject matter of new claims 33 and 34 are supported by the specification as filed (see, for example, page 3, lines 29-37).

Section 112, Paragraph 2, Formalities Re Claims 1-4

The Examiner has rejected claims 1-4 under 35 U.S.C. 112, paragraph 2, as allegedly failing to adequately define the claimed invention. Specifically, the Examiner asserts that:

[Independent] claim 1 is confusing in reciting, "vertical rotating means ... to vertically rotate a transparent cylinder" because it is unclear how the rotating means, which is vertical, can vertically rotate the cylinder ... analogous comments apply to claims 2-3. (Office Action at page 3, ¶ 4.)

In claim 2, "bare code" should be -- bar code. -- (Office Action at page 3, ¶ 4.)

Independent claim 1 has been amended to more clearly recite that the claimed cytometer *apparatus rotates a transparent cylinder along the transparent cylinder's longitudinal axis*. This amendment is not believed to alter the scope of the claimed subject matter or to introduce new limitations, but is directed to more clearly reciting the material submitted at filing.

Claims 2-4 have been amended to provide clear antecedent basis for all recited elements of the claimed cytometer apparatus. In particular, claims 2-4 have been amended to provide clear and proper antecedent basis for inner and outer walls of a transparent cylinder.

Section 112, Paragraph 2, Formalities Re Claims 10-32

The Examiner has rejected claims 10-32 under 35 U.S.C. 112, paragraph 2, as allegedly failing to adequately define the claimed invention. Specifically, the Examiner asserts that:

[Claims 10-13, 25 and 30-32 fail] to particularly point out and distinctly claim the subject matter which applicant regards as the invention ... [Claim 15 is indefinite for its use of the term] substantially ... [and] ... Claim 31 is vague and indefinite ... because it is unclear what is encompassed by the term responsive. (Office Action at pages 3-5, ¶ 5.)

Claims 10, 12, 13, 18, 23-26 and 29-31 have been amended to remove any ambiguity related to antecedent basis issues. Claim 32 has been cancelled without prejudice.

With respect to claim 15, The Patent Act only requires reasonable precision in delineating the bounds of the claimed invention. *United States v. Teletronics, Inc.*, 857 F.2d 778, 786 (Fed. Cir. 1988), *cert. denied*, 490 U.S. 1046 (1989). To meet the requirements of 35 U.S.C. 112, a patent claim need only *reasonably apprise those skilled in the art* as to their scope and be as precise as the subject matter permits. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385 (Fed. Cir. 1986), *cert. denied*, 480 U.S. 947 (1987). *See also* M.P.E.P. 2173.01 (applicants may use whatever terms they choose so long as those terms are not used in ways that are contrary to accepted meanings in the art). "Substantially smaller" is a term of degree that within the context of the specification and, in particular, FIG. 1 is as clear as required by Patent Office guidelines and established case law. *See, for example, Andrew Corp. v. Gabriel Electronics, Inc.*, 847 F.2d 819, 821 (Fed. Cir.), *cert denied*, 488 U.S. 927 (1988), *citing Seattle Box Co. v. Industrial Crating & Packing*, 731 F.2d 818, 826 (Fed. Cir. 1984) ("Substantially equal" is a term of degree, and its acceptability depends on "whether one of ordinary skill in the art would understand what is claimed. in light of the specification," even if experimentation may be needed).

With respect to claim 31, amendments thereto are believed to make it clear that the detector is "responsive to a light signal generated by one of the light sources" for the purpose of cytometric analysis (see independent claim 10). Accordingly, in the context of light detectors and cytometric apparatus, Applicant believes use of the term "responsive" would be clear and unambiguous to one of ordinary skill in the art. (See also, Applicant's discussion above regarding claim 15.)

Section 112, Paragraph 1, Rejection of Claims 10-32

The Examiner has rejected claims 10-32 under 35 U.S.C. 112, paragraph 1, as allegedly failing to be adequately supported by the specification. Specifically, the Examiner asserts that:

[T]he specification does not appear to provide support for "the transparent cylinder comprising: a closed end, an open end, a cell guide member, and a cap" ... The specification further lack literal and descriptive support for the recitation of "rotating means adapted to sequentially rotate the transparent cylinder in two directions" and "rotating means is adapted to rotate the transparent cylinder between approximately 50-3000 revolutions per minute. Lastly, there is no literal or descriptive support describing the ranges set forth in claims 19 and 23." (Office Action at pages 6-7, ¶ 6.)

With respect to the Examiner's allegation that the specification lacks support for "the transparent cylinder comprising: a closed end, an open end, a cell guide member, and a cap," the Examiner is directed to FIG. 1 and the specification as filed at pages 2 (lines 29-37), 3 (lines 29-37), and 4 (lines 27-37).

With respect to the Examiner's allegation that the specification lacks support for "rotating means adapted to sequentially rotate the transparent cylinder in two directions," it is believed one of ordinary skill in the art of electrical apparatus design would recognize that motors may be operated (spun) in both a first and second direction. For example, Applicant asserts that it is common knowledge that stepper motors (see, for example, the specification as filed at page 4, lines 32-33, page 5, lines 7-13 and page 6, lines 21-24) are routinely used to rotate in one or both directions.

With respect to the Examiner's allegation that the specification lacks support for "rotating means is adapted to rotate the transparent cylinder between approximately 50-3000 revolutions per minute," Applicant believes that one of ordinary skill in the art of electrical apparatus design would recognize that motors of the type described (compact disk and magnetic disk drive motors as indicated in the specification, as filed, at page 7, lines 13-26) typically operate in the range of a few, to many, thousands of revolutions per second. Applicant further believes that one of ordinary skill in the art of flow cytometry would readily understand that the specification teaches spinning at a rate sufficient to place (through centrifugal force) the cells being analyzed on the inner wall of the transparent cylinder. See, for example, the specification as filed at pages 2 (lines 4-6), 2 (lines 33-37), 3 (lines 16-28). Accordingly, Applicant believes the range of rotational velocities cited in claim 12 are supported by the specification as filed.

With respect to the Examiner's allegation that the specification lacks support for "there is no literal or descriptive support describing the ranges set forth in claims 19 and 23," the Examiner is directed to the specification, as filed, at page 8, lines 34-36 which recites a litany of light sources:

Said light sources can include ultraviolet LEDs, visible LEDs, infrared LEDs, ultraviolet diode lasers, visible diode lasers, infrared diode lasers, gas lasers, incandescent sources, and the like.

It is known in the optical arts that ultraviolet light comprises light having wavelengths of between approximately 100 nm to approximately 400 nm. Accordingly, the specification supports the lower limit of the subject matter recited in dependent claims 19 and 23.

Section 102 Rejections

The Examiner has rejected claims 1-4, 10-18 and 24-32 as allegedly being anticipated under 35 U.S.C. 102(b) by various prior issued U.S. patents. Specifically, the Examiner asserts that:

Claims 1-2, 10, 13, 17, 21-22, 24-26, and 31-32 are anticipated by U.S. Patent 5,439,645 to Saralegui et al. (Office Action at pages 7-8, ¶ 8.)

Claims 1, 3-4, 10-18, 22, and 24-32 are anticipated by U.S. Patent 5,639,428 to Cottingham. (Office Action at pages 8-9, ¶ 9.)

Claims 1, 4, 10, 13-18, 22, 26-29, and 31-32 are anticipated by U.S. Patent 6,254,834 to Anderson et al. (Office Action at page 10, ¶ 10.)

Independent claims 1 and 10 have been amended to recite a cytometric apparatus adapted to "rotate a transparent cylinder along a longitudinal axis of the transparent cylinder." None of the cited prior art teach, describe or fairly suggest a technique to rotate a sample container (e.g., the transparent cylinder) along the sample container's longitudinal axis. In Saralegui et al. see, for example, FIG. 3. In Cottingham see, for example, FIG. 2. In Anderson et al. see, for example, FIG. 3F.

For at least these reasons, the Examiner's section 102 rejection of independent claims 1 and 10 is improper. For at least these same reasons, dependent claims 2-4 and 11-18, 21, 22 and 24-31 are patentable over the cited prior art. Accordingly, Applicant respectfully requests this rejection be withdrawn and the claimed subject matter allowed to pass to allowance.

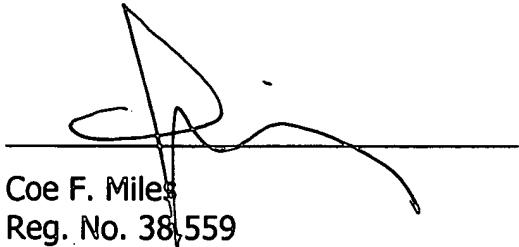
Section 103 Rejections

The Examiner has rejected claims 19, 20 and 23 as allegedly being unpatentable under 35 U.S.C. 103(a) over U.S. Patent 5,639,428 to Cottingham in view of U.S. Patent 6,254,834 to Anderson et al. (Office Action at pages 11-12, ¶ 11.)

Each of claims 19, 20 and 23 depend from independent claim 10 and are, therefore, patentable for at least the same reasons as is claim 10 (see discussion above). Accordingly, Applicant respectfully requests this rejection be withdrawn and the claimed subject matter allowed to pass to allowance.

CONCLUSIONS

Reconsideration of the pending claims (1-4, 10-31, 33 and 34), in light of the above remarks and amendments is respectfully requested. If, after considering this reply, the Examiner believes that a telephone conference would be beneficial towards advancing this case to allowance, the Examiner is strongly encouraged to contact the undersigned attorney at the number listed.


Coe F. Miles
Reg. No. 38,559

15 AUG 2002

Date

THE Law Offices of Coe F. Miles, P.C. (Customer No. 29664)
15150 Middlebrook Drive
Houston, Texas 77058

Voice: 281-488-6337
Mobile: 713-502-5382
Facsimile: 281-488-4597

Email: cmiles@MilesLawOffices.com

Substitute Specification

Two copies of a substitute specification are attached hereto. A first copy indicates all changes (additions and deletions) in mark-up format. A second copy is a clean copy void of mark-up indications.

Claims (amendments shown in mark-up format)

- 1 1. (Amended) A cytometer apparatus comprising:
 - 2 a [vertical] rotating means adapted to receive and [vertically] rotate a
 - 3 transparent cylinder along a longitudinal axis of the transparent cylinder;[,
 - 4 a light source [and detector]adapted to [interrogate] illuminate at least a portion
 - 5 [the wall] of said [vertically rotating] transparent cylinder[, and];
 - 6 a detector adapted to detect a light signal provided by said light source and
 - 7 reflected from said transparent cylinder;
 - 8 determining means for determining at least one cytometric characteristic of a
 - 9 sample disposed in said transparent cylinder based on said light signal; and
 - 10 a movement means for moving said [vertically rotating] transparent cylinder [or]
 - 11 and said light source and detector in a longitudinal axis relative to one another [moved
 - 12 vertically to interrogate the wall of said vertically rotating transparent cylinder].

- 1 2. (Amended) The cytometer apparatus [transparent rotating cylinder] as set forth
2 in claim 1, wherein said transparent cylinder comprises [having] a bar[e] code label
3 affixed to [its] an outer wall thereof, [said bar code label vertically aligned, and] said
4 bar code label adapted to be interrogated by said [light source and] detector means.

1 3. (Amended) The cytometer apparatus [transparent rotating cylinder] as set forth
2 in claim 1, wherein said transparent cylinder has an inner wall having calibration
3 standards affixed thereon [to its inner wall, and said affixed standards interrogated by
4 said light source and detector].

1 4. (Amended) The cytometer apparatus [transparent rotating cylinder] as set forth
2 in claim 1, wherein said transparent cylinder comprises an inner wall having a
3 photoactivated crosslinker [on its inner wall] affixed thereon.

1 10. (Amended) A spin cytometer, comprising:
2 a rotating means adapted to [receive and] rotate a transparent cylinder about a
3 longitudinal axis of the transparent cylinder;
4 a light source adapted to illuminate at least a portion of [a] the transparent
5 cylinder [when said transparent cylinder is coupled to said rotating means];
6 a detector means for detecting [responsive to] a light signal generated by the
7 light source and reflected from [a] the transparent cylinder [when said transparent
8 cylinder is coupled to said rotating means; and];
9 determining means for determining at least one cytometric characteristic of a
10 sample disposed in said transparent cylinder based on said detected light signal; and
11 a movement means for moving the transparent cylinder and the light source and
12 detector means in [a] relative [vertical] motion.

1 11. The spin cytometer of claim 10, wherein the rotating means is further adapted to
2 sequentially rotate a transparent cylinder in two (2) directions.

1 12. (Amended) The spin cytometer of claim 11, wherein the rotating means is
2 adapted to rotate [a] the transparent cylinder between approximately 50 and 3000
3 revolutions per minute.

1 13. (Amended) The spin cytometer of claim 10, wherein the rotating means is
2 adapted to rotate [receive] a transparent cylinder comprising:
3 a closed end;
4 an open end;
5 a cell guide member having a first side oriented toward the open end, a second
6 side oriented toward the closed, and a passage from the first side to the second side;
7 and
8 a cap adapted to seal the open end.

1 14. The spin cytometer of claim 13, wherein the passage is smaller at said first side
2 than it is at said second side.

1 15. The spin cytometer of claim 14, wherein the passage is substantially smaller than
2 the diameter of said transparent cylinder.

1 16. The spin cytometer of claim 13, wherein the closed end has a smaller outside
2 diameter than the open end.

1 17. The spin cytometer of claim 13, wherein said transparent cylinder comprises a
2 polystyrene cylinder.

1 18. (Amended) The spin cytometer of claim 13, wherein an inner wall of said
2 transparent cylinder comprises an organic photoreceptor material affixed thereon.

1 19. The spin cytometer of claim 18, wherein the organic photoreceptor material is
2 activated by a wave length of approximately 300 nanometers to approximately 100
3 nanometers.

1 20. The spin cytometer of claim 19, wherein the organic photoreceptor material
2 comprises dibromo anthanthrone.

1 21. The spin cytometer of claim 10, wherein the rotating means comprises a stepper
2 motor.

1 22. The spin cytometer of claim 10, wherein the light source comprises a light
2 emitting diode.

1 23. (Amended) The spin cytometer of claim 22, wherein the light emitting diode is
2 adapted to emit a light having a wavelength of between approximately 500 [300]
3 nanometers and 100 nanometers.

1 24. (Amended) The spin cytometer of claim 10, wherein the detector means further
2 comprises an analog to digital converter.

1 25. (Amended) The spin cytometer of claim 24, wherein the detector means further
2 comprises:

3 an analog to digital converter; and

4 a processing means for associating a location identifier with an analog to digital
5 converter output value, the location identifier identifying a location on [a] a surface of
6 the transparent cylinder at which the digital to analog value was obtained.

1 26. (Amended) The spin cytometer of claim 10, further comprising an additional one
2 (1) or more light sources, each light source adapted to illuminate at least a portion of a
3 transparent cylinder [when said transparent cylinder is coupled to said rotating means].

1 27. The spin cytometer of claim 26, wherein each of the additional one (1) or more
2 light sources are adapted to emit a different wavelength.

1 28. The spin cytometer of claim 10, further comprising at least one diffraction
2 grating.

1 29. (Amended) The spin cytometer of claim 10, wherein the detector means
2 comprises a photomultiplier.

1 30. (Amended) The spin cytometer of claim 10, wherein the detector means
2 comprises a [CCD] charge coupled device.

1 31. (Amended) The spin cytometer of claim 27, further comprising an additional one
2 (1) or more detector[s] means, each detector means responsive to a light signal
3 generated by one of the light sources [and reflected from a transparent cylinder when
4 said transparent cylinder is coupled to said rotating means].

1 33. (New) The spin cytometer of claim 10, wherein the movement means moves the
2 transparent cylinder in a direction substantially parallel to the transparent cylinder's
3 longitudinal axis.

1 34. (New) The spin cytometer of claim 10, wherein the movement means moves the
2 light source and detector means in a direction substantially parallel to the transparent
3 cylinder's longitudinal axis.